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PLANT PHYSIOLOGY AND TERATOLOGY.

(1) *Botany: a Text-book for Senior Students.* By D. Thoday. Pp. xvi+474. (Cambridge: At the University Press, 1915.) Price 5*s*. 6*d*. net.

(2) *The Principles of Plant-Teratology.* By W. C. Worsdell. Vol. i. Pp xxiv+269+plates xxv. (London: The Ray Society, 1915.) Price 25*s*. net.

(3) *Some Recent Researches in Plant Physiology.* By Dr. W. R. G. Atkins. Pp. xi+328. (London: Whittaker and Co., 1916.) Price 7*s*. 6*d*. net.

(1) MR. THODAY'S text-book is intended primarily for use in connection with the Senior Cambridge Local Examinations, but it is hoped that it may prove of more general service to teachers as well as to scholars in the upper forms of secondary schools. Since the author brings to bear on his task not only his experience as a teacher, but some years' experience as an examiner, he should be in a fair way to succeed. A good text-book is one of the factors which may bring success in these examinations, but the efficient teacher and adequate provision in the school curriculum are also factors which cannot be eliminated.

However, our concern is with Mr. Thoday's book, and we congratulate him on his achievement. It is different from other text-books. There is a certain refreshing originality of treatment in dealing with the common objects of the examination syllabus, and the matter is well and clearly written; it is, in fact, a readable text-book. The point of view is the physiological one; the vegetative organs of the plant are approached and studied as structures adapted for carrying out the life-functions of the plant; form and structure are subservient to function. The rigid morphologist will feel that an opportunity has been missed. Experimental work falls naturally into place in the subject-matter, and good use is made of matters of common observation in Nature and plant-life. In the chapters dealing with classification the author has worked out the characters of some of the best-known British families of flowering plants by reference to commonly occurring genera and species, and the various grades of relationship are used to illustrate the ideas of evolution and variation. The last section, entitled "Plants in relation to their Environment," contains a good chapter on trees and a short introduction to the study of plant associations. Text-figures are sufficiently frequent and good; many of them are new.

(2) The plant morphologist will find food for thought in plenty in Mr. Worsdell's volume on "The Principles of Plant-Teratology." In 1869 the Ray Society issued the late Dr. Maxwell Masters's work on "Vegetable Teratology"; this was for many years the standard work on the subject, and is even to-day the book to which one naturally turns for easy reference in matters teratological. Mr. Worsdell does no more than justice when he expresses himself as "in some degree indebted to Dr. Masters for facts and ideas." "The present work," he states, "is intended to present the subject in more scientific fashion and in quite a new form, both as regards the mode of treatment and the large number of additional facts." The author's position may be briefly summarised as follows. The work is not a mere descriptive tabulation of interesting and curious freaks, but a contribution to the evolutionary origin of plant-organs, of which there are three categories only, root, stem, and leaf, although in reality the stem is non-existent, being composed of leaf-bases. Comparative and teratological, as contrasted with developmental and anatomical, are the only trustworthy methods of morphological investigation. Many abnormalities are progressive in character, not reversions; they are of great importance for the interpretation of structures of doubtful nature. All structures, whether normal or abnormal, are regarded as purposive rather than fortuitous in their origin. They are originated and maintained by the action of a regulative vital force, and not by mere chemico-physical energies: the dynamic teleological or vitalistic position is upheld as against the mechanistic or materialistic one. This is enough to indicate Mr. Worsdell's point of view and to show that the author invites severe criticism from the more orthodox plant-morphologists. Moreover, one cannot but feel that the insistent and somewhat aggressive emphasis of matters of theory does to some extent detract from the value of what is otherwise a useful piece of work. It is for this reason not a safe book to put into the hands of the non-critical student.

Mr. Worsdell has been for many years studying plant-abnormalities at first hand, and the present volume embodies the results of his investigations so far as concerns the non-vascular plants and the vegetative organs of the vascular plants. Abnormalities described by previous writers are also recorded and discussed, while frequent bibliographical lists supply a large number of additional references. The chapter on fungi is a short one, and deals with the various abnormal developments of the sporophore of the cap-fungi. A similar remark applies to the bryophytes; a few pages are devoted to adventitious shoots and protonema formation; and there is a short account of "double" sporogonia. The root of the vascular plant is less prone than any of the other organs to deviate from the normal form, and its aberrations occupy only a few pages. The greater part of the book deals with the stem and the leaf. The second volume will deal with the flower. A useful feature is the large series of photographic plates, twenty-five in number, at the end of the volume; there are also a number of rather crude figures distributed through the text. The typography is clear, and there is a useful subject-index.

(3) Dr. Atkins, in his handy little volume on some recent researches in plant physiology, aims

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at presenting to senior students and investigators the results of recent work in a few of those branches which are at present attracting attention. It is supplementary to the text-books, and should prove of great value to those whom the subject more nearly concerns. The value of the work is enhanced by the author's choice of material, since he has selected those subjects with which he was specially familiar and on which he was able to write with a first-hand knowledge. Starting with the classic researches of Brown and Morris, the author deals in the first two chapters with the carbohydrates of the leaf in relation to photosynthesis and with the methods of estimating carbohydrates in plant extracts. This is followed by short chapters on the carbohydrates of the cellular cryptogams. Other chapters deal with osmotic pressure and its relation to plant distribution, and to morphological variations; the permeability of protoplasm and of other organic membranes; and the magnitudes of osmotic pressures and electrical conductivities in plants. A chapter on the functions of the wood is followed by an account of the plant oxydases and their relation to pigmentation, and the final chapter is on the oxydases in relation to plant pathology and to technology. At the end of the volume there is a bibliography classified under the headings of the subject-matter adopted in the text.

WORKS ON CIVIL ENGINEERING.

(1) *American Civil Engineers' Pocket-Book.* Editor-in-chief, M. Merriman. Third edition, enlarged. Pp. ix + 1571. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 21*s.* net.

(2) *Parks and Park Engineering.* By Prof. W. T. Lyle. Pp. viii + 130. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 5*s.* 6*d.* net.

(3) *Masonry Dam Design, including High Masonry Dams.* By Dr. C. E. Morrison and Orrin L. Brodie. Second edition, revised and enlarged. Pp. ix + 276. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 10*s.* 6*d.* net.

(4) *Earth Pressure, Retaining Walls, and Bins.* By Prof. William Cain. Pp. x + 287. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 10*s.* 6*d.* net.

(1) THE "American Civil Engineers' Pocket-Book" has already established an enviable reputation for trustworthiness and completeness, which is well maintained in the third edition. A new section of ninety-six pages on river and harbour works has been added, whilst important additions have been made in the other sections. The scope of the book is wide, each subject being written by a specialist in the particular branch dealt with, although the treatment is simple and requires a minimum of previous knowledge.

Valuable features of the book are the numerous examples worked out where concise and accurate description would otherwise be difficult. Although the question of cost varies enormously with time and locality, the tables of prices of works executed will add greatly to the use of the volume.

In view of the importance of the subject to makers and users of machinery, it is somewhat disappointing to find only one short paragraph devoted to hardness tests of metals. We also think that it is time some of the work which has been carried out lately upon struts and columns should be incorporated.

This pocket-book is one which is probably destined to form a standard reference-book for every civil engineer.

(2) It is now generally recognised that amongst the best investments for an urban community is the provision of parks and recreation-grounds. Indeed, in several recent cases the actual appreciation in value of surrounding property following upon the transformation of waste land to this purpose has been greater than the outlay. A very readable book upon the subject of parks and park engineering has been written by Prof. W. T. Lyle, of Lafayette College, which, although dealing with the American aspect of the case, will be found useful by members of public bodies responsible for the planning of our cities and towns. The first chapter of the book deals with the acquisition of parks and their lay-out. Other chapters are concerned with the survey and design, while interesting and instructive articles on labour and contracts and construction should prove of great assistance to the non-professional man, and also to young and inexperienced engineers of construction. In his preface the author points out that "the art of the park engineer, though a specialty, is, however, not a narrow specialty. He must be proficient in matters pertaining to the acquisition of lands, and be well versed in a great variety of engineering operations, such as earth excavation, masonry, waterworks and sewerage construction, road building and lighting, and occasionally the construction of steel and reinforced-concrete bridges. He must also be a good expert witness." The scope is very wide, and can only be superficially treated in one volume. The book will undoubtedly fill a useful place and serve as an introduction to more specialised works on construction.

(3) During the last few years there has been considerable discussion amongst engineers as to what methods should be adopted and what assumptions made in the design of high masonry dams. The subject is of extreme importance, since we have, on one hand, large expenditure of money in providing margins of safety above those really necessary, and, on the other, the fact that failure must be rendered impossible. The most recent methods of calculation and design are very ably treated in Morrison and Brodie's "Masonry Dam Design," the second edition of which has just been published. In the revision the authors have amplified a number of points which were treated very shortly in the

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